

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

SIEMENS MEDICAL SOLUTIONS)	
USA, INC.,)	
)	
Plaintiff,)	
)	
v.)	Civ. No. 07-190-SLR
)	
SAINT-GOBAIN CERAMICS &)	
PLASTICS, INC.,)	
)	
Defendant.)	

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MEMORANDUM OPINION

Dated: January 8, 2008
Wilmington, Delaware



ROBINSON, District Judge

I. INTRODUCTION

Plaintiff Siemens Medical Solutions USA, Inc. ("plaintiff") asserts in this case that defendant Saint-Gobain Ceramics & Plastics, Inc. ("defendant") infringes U.S. Patent No. 4,958,080 ("the '080 patent"), to which plaintiff has an exclusive license. (D.I. 1) The '080 patent claims what has been described as a breakthrough in the field of medical imaging, that is, a gamma or x-ray detector that incorporates a particular scintillator.¹ This scintillator is a crystal, made of cerium-doped lutetium oxyorthosilicate ("LSO"). Defendant manufactures lutetium-yttrium orthosilicate ("LYSO") scintillation crystals for use in medical scanners. Currently before the court is plaintiff's motion for a preliminary injunction.² (D.I. 18) For the following reasons, the court denies plaintiff's motion.

II. BACKGROUND

In most basic terms, positron emission tomography (or "PET") scanners create images by detecting gamma rays produced by a radioisotope after it is administered to a patient. Gamma rays are converted into photons of visible light by scintillator crystals. (D.I. 22 at ¶ 20) These photons can be measured with photodetectors, resulting in the generation of a three-dimensional image of the area of the patient's body being scanned. (*Id.*)

¹A scintillator, generally, is a substance that absorbs high energy radiation and, in response, fluoresces photons at a specific, longer wavelength, releasing the previously absorbed energy.

²Plaintiff's motion was filed July 9, 2007. (D.I. 18) Briefing on the motion was completed on November 5, 2007. Document discovery closed November 21, 2007; fact discovery is ongoing. (D.I. 15)

The '080 patent, which describes LSO crystals, was filed on August 4, 1989. The '080 patent generally claims X-ray and gamma ray detectors that incorporate LSO crystals.³ LSO crystals, as described by the '080 patent, were generally recognized as the next scintillation crystal generation technology. (D.I. 20, ex. 3 at col. 1, l. 65-col. 2, l. 3; *id.*, ex. 4 at col. 2, ll. 28-44) As disclosed by the '080 patent, LSO crystals had improved scintillation properties, such as light output, energy resolution, scintillation decay time, and index of refraction, over prior art crystals. ('080 patent, col. 8, ll. 29-42 & Table 5) The '080 patent is set to expire on October 6, 2008.

In contrast to the LSO crystals of the '080 patent, which contain only lutetium, defendant's LYSO crystals represent a 10% (by mole) substitution of the element yttrium for lutetium. LYSO crystal scintillators are the subject of U.S. Patent No. 6,624,420 ("the '420 patent") to Chai et al.⁴ The '420 patent is assigned to the

³Claim 1 of the '080 patent reads:

1. A gamma ray or x-ray detector, comprising: a scintillator composed of a transparent single crystal of cerium-activated lutetium oxyorthosilicate having the general formulation $\text{Ce}_{2x}\text{Lu}_{2(1-x)}\text{SiO}_5$, where x is within the range of from approximately 2×10^{-4} to approximately 3×10^{-2} , and a photodetector optically coupled to the scintillator for producing an electrical signal in response to the emission of a light pulse by the scintillator.

⁴U.S. Patent No. 6,323,489 to McClellan ("the '489 patent"), assigned to the Regents of the University of California, was filed June 4, 1999 and issued November 27, 2001. The '489 patent claims a crystal scintillator comprising LYSO crystals. As the result of an interference action between the '489 patent and the application that issued as the '420 patent, which was filed on February 17, 2000 and issued September 23, 2003, the '489 patent was ultimately surrendered.

Claim 1 of the '420 patent reads:

A scintillator detector for high energy radiation comprising: a monocrystalline structure of cerium doped lutetium yttrium orthosilicate, $\text{Ce}_{2x}(\text{Lu}_{1-y}\text{Y}_y)_{2(1-x)}\text{SiO}_5$ where x= approximately 0.0001 to approximately 0.05 and y= approximately

University of Central Florida and Crystal Photonics; Inc.; defendant's manufacture and sale of LYSO crystals is licensed by the University. (D.I. 42 at ¶ 16) Defendant sells LYSO crystals under the tradename PreLude 420. Defendant's PreLude 420 crystals are incorporated into medical scanners manufactured by other companies.

The "Gemini Raptor" and "Gemini TF"⁵-branded PET scanners sold by Philips, one of plaintiff's medical imaging competitors, utilize defendant's LYSO crystals. (D.I. 19 at 4) Plaintiff asserts that Philips' sale of its scanners directly infringes the '080 patent, and defendant's supply of the LYSO crystals contributorily infringes the '080 patent. (*Id.*; D.I. 155 at 16) Plaintiff also claims that defendant has induced Philips' alleged infringement of the '080 patent. (D.I. 155 at 16)

III. LEGAL STANDARDS

A. Preliminary Injunction

Traditional rules of equity apply to requests for injunctive relief in patent cases. eBay, Inc. v. MercExchange, L.L.C., --- U.S. ---, 126 S.Ct. 1837, 1839 (2006).

District courts have the power to grant injunctions to prevent the violation of patent rights. *See* 35 U.S.C. § 283 (2000). In considering whether to grant a preliminary injunction, a court must consider whether the patent owner has shown: (1) a reasonable likelihood of success on the merits; (2) the prospect of irreparable harm to the patent owner in the absence of the injunction; (3) that this harm would exceed harm to the alleged infringer when subject to the injunction; and (4) that granting the injunction is in the public interest.

Canon, Inc. v. GCC Intern. Ltd., No. Civ. A. 06-1615, 2007 WL 4005018, *2 (Fed. Cir.

0.0001 to approximately 0.9999.

⁵The Gemini TF scanner also utilizes "time of flight" image correlation technology that enables a clearer image by measuring the time it takes photons to reach the detector.

Nov. 16, 2007) (quoting Pfizer, Inc. v. Teva Pharms., USA, Inc., 429 F.3d 1364, 1372 (Fed. Cir. 2005) (additional citations omitted)).

B. Infringement Under the Doctrine of Equivalents

To prove direct infringement, the plaintiff must establish by a preponderance of the evidence that one or more claims of the patent read on the accused device literally or under the doctrine of equivalents. See Advanced Cardiovascular Sys., Inc. v. Scimed Life Sys., Inc., 261 F.3d 1329, 1336 (Fed. Cir. 2001). For there to be infringement under the doctrine of equivalents, the accused product must embody every limitation of a claim, either literally or by an equivalent. See Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 41 (1997). In Graver Tank & Mfg. Co. v. Linde Air Products Co., 339 U.S. 605, 608-10 (1950), the Supreme Court stated that the doctrine of equivalents applies: (1) when the equivalent represents an “insubstantial” change from the claim language; or (2) “if it performs substantially the same function in substantially the same way to obtain the same result.”⁶ See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 493 F.3d 1368, 1377 (Fed. Cir. 2007) (citing Graver Tank, 339 U.S. at 608, 610)). The latter is often referred to as the “function, way, result” test. The court must consider which framework is more logically applied, since

[d]ifferent linguistic frameworks may be more suitable to different cases, depending on their particular facts. A focus on individual elements and a special vigilance against allowing the concept of equivalence to eliminate completely any

⁶ “[A] skilled practitioner’s knowledge of the interchangeability between claimed and accused elements” is one factor that may aid the fact-finder in assessing the similarities and difference between a claimed and an accused element. Warner-Jenkinson Co., 520 U.S. at 37.

such elements should reduce considerably the imprecision of whatever language is used. An analysis of the role played by each element in the context of the specific patent claim will thus inform the inquiry as to whether a substitute element matches the function, way, and result of the claimed element, or whether the substitute element plays a role substantially different from the claimed element.

Warner-Jenkinson Co., 520 U.S. at 40. Stated another way, equivalence “is not the prisoner of a formula and is not an absolute to be considered in a vacuum”; it must be determined against the context of the patent, the prior art, and the particular circumstances of the case. Id. The proper time for evaluating equivalency is at the time of infringement, not at the time the patent was issued. Id. at 37.

IV. DISCUSSION

The issue at bar is whether plaintiff has demonstrated that it is likely to succeed on the merits of its claim that Philips’ scanners, which incorporate defendant’s LYSO crystals, infringe the ‘080 patent under the doctrine of equivalents.⁷ Put another way, the court must determine whether plaintiff is likely to demonstrate that the “transparent single crystal of cerium-activated lutetium oxyorthosilicate [LSO] having the general formulation $\text{Ce}_{2x}\text{Lu}_{2(1-x)}\text{SiO}_5$ ” limitation of the ‘080 patent encompasses the cerium doped lutetium yttrium orthosilicate (LYSO) ($\text{Ce}_{2x}(\text{Lu}_{1-y}\text{Y}_y)_{2(1-x)}\text{SiO}_5$) crystal of the accused products.⁸

A. Reasonable Likelihood of Success Under the Doctrine of Equivalents

⁷Plaintiff does not assert that Philips’ scanners meet each of the limitations of the ‘080 patent literally. It relies on the doctrine of equivalents regarding the crystal limitation. (D.I. 19 at 17-18)

⁸For purposes of the present motion, the parties do not dispute that the claims should be construed according to their ordinary meaning. (D.I. 19 at 15; D.I. 48)

1. “Function” and “way”

There is no debate over whether LYSO crystals perform the identical function to LSO crystals in the medical scanners at issue. With respect to way, plaintiff presents an affidavit of Dr. Martin J. Weber, an expert in scintillation crystallography, in which Dr. Weber states that the basic process of scintillation is not altered by defendant’s replacement of a small amount of lutetium in the patented crystals with a small amount of yttrium. (D.I. 22 at ¶¶ 18, 41) Dr. Weber explains that the primary purpose of the lutetium and/or the yttrium in scintillation crystals is to “provide a crystalline structure and to provide stopping power for gamma rays or x-rays hitting the crystal so that the crystal absorbs the energy of the radiation.” (Id. at ¶ 41) Dr. Weber states that lutetium provides somewhat greater stopping power, however, characterizes the difference as insubstantial. (Id.)

The court finds Dr. Weber’s testimony sufficient to clearly demonstrate that LSO and LYSO crystals detect gamma rays in the same way. In opposition to plaintiff’s motion, defendant proffers a declaration by its scintillation expert, Dr. Kenneth McClellan. Dr. McClellan opines that incorporating 10% yttrium will distort the crystalline lattice and create point defects⁹ in the lattice. (D.I. 41 at ¶ 21) Dr. McClellan explains that the yttrium “opens up” or stretches the matrix of the crystalline lattice (relative to LSO). (Id. at 19) This increases the probability that emitted light can escape from the crystal lattice. (D.I. 48 at 3, n.3) This appears to translate, in Dr. Weber’s terms, to a somewhat lesser stopping power.

⁹Dr. McClellan explains that “point defects” are “vacancies, interstitials, and anti-sites” relative to the ideal configuration of the crystalline lattice. (D.I. 41 at ¶ 21)

There is nothing in Dr. McClellan's declaration, however, which tends to indicate any difference in the "way" LYSO crystals function vis-a-vis LSO. That is, although the transmittal of light may be facilitated by the LYSO matrix, Dr. McClellan does not indicate, and defendant points to no other evidence which tends to indicate, that the scintillation process achieved by the patented scanner and the accused scanner differs.¹⁰

2. Equivalency of "result" and "known interchangeability"

a. Evidence of record

The '080 patent discloses that LSO crystals had improved scintillation properties over the prior art, including: light output, energy resolution, scintillation decay time, and index of refraction. LSO was also described as having an emission peak comparable to GSO, a prior art compound. ('080 patent, table 5 & col. 8, l. 29 - col. 9, l. 25) Plaintiff obtained and tested two samples of defendant's LYSO crystals for these properties.¹¹ The results indicate a near identical result for light output,¹² excitation spectra,¹³

¹⁰Indeed, the '420 patent states that the basic scintillation mechanism is well known in the art and reasonably well understood. ('420 patent, col. 2, l. 61- col. 3, l. 4) Though the experts characterize this process differently, Dr. Weber in four steps and Dr. McClellan (and the '420 patent) in three, there is no dispute regarding this basic process.

¹¹Plaintiff has presented an affidavit by Niraj Doshi, Ph.D., a scientist employed by plaintiff, which details the methodology of the testing. (D.I. 21)

¹²"564-573 relative to BGO=100" for LYSO; "550-598 relative to BGO=100" for LSO. (D.I. 21, ex. E; D.I. 22 at ¶ 44)

¹³(D.I. 21, ex. F; D.I. 22 at ¶ 44)

emission spectra,¹⁴ radioluminescence,¹⁵ and decay time.¹⁶ Defendant neither contests the accuracy of plaintiff's test data nor puts forward any countervailing data. (D.I. 48)

As described by the '420 patent, LYSO crystals resolved several problems associated with LSO. LYSO crystals: (1) have a lower growth temperature; (2) "reduce proportionally the trace concentration of the naturally radioactive Lu¹⁷⁶ isotope without sacrificing the net light yield" (thereby reducing background noise of the detector); (3) "reduce the cost and improve the uniformity of scintillating efficiency for large single crystal plates" due to the reduction in costly Lu₂O₃ starting material; (4) reduce the "already low value of the index of refraction of LSO"; (5) and have an increased "effective Z"¹⁷ coupled with a desirable radiation length. ('420 patent, col. 6, l. 59 - col. 7, l. 24) As plaintiff points out, the '420 patent states that it was the inventors' desire "to minimize the yttrium content to retain the LSO scintillating properties," and emphasized that "LYSO is a valuable and very efficient scintillator as long as the crystal contains more than 30% lutetium."¹⁸ ('420 patent, col. 4, ll. 30-32, col. 6, ll. 39-43)

¹⁴(D.I. 21, ex. G; D.I. 22 at ¶ 44) It is not clear from the record how either spectra may correlate with energy resolution. Dr. Weber lists a 8.8-8.13% energy resolution for LSO as described by the '080 patent (8.2-9.5% for plaintiff's current commercial LSO) and an 8% resolution for defendant's LYSO crystals (8.1-9.4% for "PreLude 420 test" crystals).

¹⁵(D.I. 21, ex. H; D.I. 22 at ¶ 44)

¹⁶(D.I. 21, ex. I; D.I. 22 at ¶ 44)

¹⁷Generally, the average number of electrons per atom in a compound.

¹⁸Defendant's documents further indicate that, in developing its LYSO, it "determined [the percentage] of Y[ttrium] necessary to meet [the '420] University of Central Florida patent while avoiding LSO I[n]tellectual P[roperty] issues." (D.I. 62, ex. I at 29877)

Dr. McClellan states that the substitution of yttrium for lutetium disturbs “the lattice relative to the end member compositions[,] enabling tailoring of specific properties such as background optical emission[,] due to naturally occurring radioactive isotope[s], prompt emission light output, afterglow, and density.” (D.I. 41 at ¶ 23) Dr. McClellan does not expand further upon these performance benefits. Dr. McClellan emphasizes that LYSO provides the advantages of “[t]he ability to tailor scintillator performance and to balance that performance against fabrication considerations.” (*Id.* at ¶¶ 11, 25)

b. Separate Patentability

Defendant asserts that a grant of a preliminary injunction in this case would effectively be a judgment that the ‘420 patent, which claims a scintillator containing LYSO crystals, is invalid. (D.I. 48 at 2) That is, the argument that “LYSO is a mere insubstantial equivalent to the LSO of the ‘080 patent” was rejected by the United States Patent and Trademark Office (“PTO”) both during prosecution of the ‘489 patent and, separately, the ‘420 patent, each of which issued over the ‘080 patent. (*Id.* at 25)

“The fact of separate patentability is relevant and entitled to due weight.”

National Presto Indus., Inc. v. West Bend Co., 76 F.3d 1185, 1192 (Fed. Cir. 1996).

The Federal Circuit has

not directly decided whether a device – novel and separately patentable because of the incorporation of an equivalent feature – may be captured by the doctrine of equivalents, although [the Court has] held that when a device that incorporates the purported equivalent is in fact the subject of a separate patent, a finding of equivalency, while perhaps not necessarily legally foreclosed, is **at least considerably more difficult to make out**. But there is a strong argument that an equivalent cannot be both non-obvious and insubstantial.

Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 493 F.3d 1368, 1379-80 (Fed. Cir. 2007) (citations omitted) (emphasis added); compare Fiskars, Inc. v. Hunt Mfg. Co., 211 F.3d 1318, 1324 (Fed. Cir. 2000) (“separate patentability does not avoid equivalency as a matter of law”); Hoechst Celanese Corp. v. BP Chemicals Ltd., 78 F.3d 1575, 1582 (Fed. Cir. 1996) (declining to find defendant’s practice of separately patentable method to be “presumptive evidence of non-infringement”).

c. Analysis

Although plaintiff has adduced evidence that ultimately may demonstrate infringement under the doctrine of equivalence in this case, the court finds that the issue of equivalence does not weigh predominately in plaintiff’s favor so as to justify injunctive relief at this early stage of the proceedings. Dr. McClellan’s declaration is not helpful with respect to illuminating the performance benefits (i.e., differences in “result”) of using LYSO as compared to LSO; comparing the convenience of manufacturing is not relevant to determining equivalency in function. Nevertheless, as demonstrated by the ‘420 patent, LYSO has several performance¹⁹ advantages that do not appear to be called into question by plaintiff’s test data, such as reduction of Lu¹⁷⁶ isotope, lower index of refraction, and an increased effective Z. As the Federal Circuit has noted, defendant has a “strong argument” that its LYSO is both novel (non-obvious) and substantially different from LSO.²⁰

¹⁹As compared to manufacturing.

²⁰The case at bar is distinguishable from Atlas Powder Co. v. E.I. du Pont de Nemours & Co., 750 F.2d 1569 (Fed. Cir. 1984), cited by plaintiff. The Court in Atlas Powder, comparing a claimed mixture with an accused mixture in which one ingredient of the claimed mixture was changed, found infringement under the doctrine of

Generally, the scintillation properties of a compound are not readily determinable or predictable until the compound is tried and tested. (See '080 patent, col. 3, ll. 6-8; '420 patent, col. 3, ll. 19-20) Accordingly, the '420 patent is evidence that the success of LYSO crystals in scintillators was previously unknown and/or non-obvious. Plaintiff has adduced evidence that defendant considered LYSO to be a "LSO equivalent" and a "near match" to LSO, which was "practically the same, at least for the user."²¹ (D.I. 62,²² ex. B at 41560, ex.H at 17739, ex. J at 40881) There is some indication that plaintiff's customers also consider LSO and LYSO crystals to be interchangeable.²³ To the extent that "known interchangeability" can coexist with separate patentability, plaintiff's burden on its preliminary injunction motion is a heightened one. The court declines to find, under the circumstances at bar, that plaintiff has demonstrated the requisite likelihood

equivalents. Id. at 1579-80 & fn.3 ("Equivalence does not require that the claimed invention and accused product have identical results; the results can be substantially the same and the accused product can be an improvement.") (citation omitted). The Court rejected defendant's argument that it was not liable for manufacture, use, or sale of patented improvement "A + B + C", even though A + B + C' is 'equivalent' to A + B + C." Id. at 1580 ("Whether [defendant] makes A + B + C + D or A + B + C', [it] has used the gist of [plaintiff's] invention to devise a patentable composition."). In the present case, LYSO and LSO are each compounds with unique chemical compositions and physical properties. In the framework of Atlas Powder, LYSO is not L + Y + S + O.

²¹Additional, comparable language appears in additional documents supplied by plaintiff.

²²The court grants plaintiff's motion for leave to file its supplemental brief (D.I. 62).

²³According to plaintiff, several documents of record indicate that customers also viewed LYSO and LSO as near-equivalents; the court was unable to readily locate these documents, identified by bates number and without any corresponding docket and/or valid exhibit numbers, in the record. (D.I. 155 at 15)

of success that could justify the extraordinary relief of an injunction at this stage.²⁴

B. Irreparable Harm

Notwithstanding the foregoing, plaintiff would not be entitled to a preliminary injunction absent a showing of irreparable harm. Plaintiff incorrectly argues that the court should apply a legal presumption that the economic harm to plaintiff caused by defendant's purported infringement is irreparable. (D.I. 19 at 32; D.I. 155 at 17) The law no longer recognizes such a presumption. See eBay, Inc. v. MercExchange LLC, 126 S. Ct. 1837, 1841 (2006).

Plaintiff further asserts that the following "facts" bear out its irreparable harm case: (1) "any inability by [plaintiff] to prevent infringement of the '080 patent would only encourage others in the field to do the same"; (2) plaintiff "is particularly vulnerable to this type of injury [to its right to exclude], as there is little over a year left on the term of the '080 patent"; (3) defendant's infringement has "impeded [plaintiff's] future innovative efforts"; (4) the "impact of [plaintiff's] anticipated introduction of its own time-of-flight PET scanner in 2008 has been blunted by Philips' introduction of the Gemini TF scanner with the same feature"; and (4) money damages are inadequate, since (a) at least one of plaintiff's customers²⁵ has introduced a medical scanner that was made possible only by infringement; and (b) plaintiff has "lost sales and market share" evidenced by a market share drop from 45% to 30% on a year-over-year basis in the third quarter of 2006. (D.I. 19 at 33-35)

²⁴The court, therefore, need not address contributory infringement and inducement of infringement.

²⁵Unnamed by plaintiff.

The most compelling and non-speculative of these arguments, that money damages are inadequate to compensate plaintiff for its 15% loss of market share, without more, does not establish irreparable injury. See Nutrition 21 v. U.S., 930 F.2d 867, 871 (Fed. Cir. 1991) (“[T]he district court’s reliance on possible²⁶ market share loss would apply in every patent case where the patentee practices the invention.”); Illinois Tool Works, Inc. v. Grip-Pak, Inc., 906 F.2d 679, 683 (Fed. Cir. 1990) (“Application of a concept that every patentee is *always* irreparably harmed by an alleged infringer’s pretrial sales would equally disserve the patent system.”). Plaintiff has not adduced any compelling reason why monetary damages would be insufficient to compensate it for this loss in market share. The fact that the ‘080 patent is set to expire on October 6, 2008 neither mitigates against nor amplifies this failure of proof.²⁷ Absent special circumstances that could justify relief at this early stage, the court would have no occasion to enjoin defendant’s sale of LYSO under its ‘420 patent license, even if infringement were more clear in this case.

²⁶Plaintiff offers an affidavit of Markus B. Lusser, its Vice President of Global Sales and Marketing for Molecular Imaging, in support for its contention that its loss of market share equalled 15% between 2005 and 2006. (D.I. 23) Defendant does not specifically take issue with Mr. Lusser’s calculation in its responsive brief. (D.I. 48 at 33-34)

²⁷The parties have not clearly identified the date(s) defendant began producing its allegedly infringing scanners. If, *arguendo*, defendant began its purported infringement in 2005, or between 2005 and 2006 (commensurate with plaintiff’s asserted market share loss), plaintiff did not file its complaint in this action until April of 2007, and the present motion was filed in July of 2007 – at least one year later. The parties have not put forward any arguments to this effect; the court does not weigh the pending expiration of the ‘080 patent as evidence of the adequacy of monetary damages, and also declines to weigh any evidence of delay in this regard.

V. CONCLUSION

For the foregoing reasons, plaintiff's motion for a preliminary injunction is denied. An appropriate order shall issue.